

CLAIMS

1. Detergent particles having an average particle size of from 150 to 500  $\mu\text{m}$  and a bulk density of 500 g/liter or more, wherein the detergent particles comprise a detergent particle being capable of releasing a bubble from an inner portion of the detergent particle in a process of dissolving the detergent particle in water, the bubble having a size of one-tenth or more of a particle size of the detergent particle, and wherein the detergent particles have a dissolution rate of 90% or more, under conditions where the detergent particles are supplied in water at 5°C; stirred for 60 seconds under the stirring conditions that 1 g of the detergent particles is supplied to a one-liter beaker having an inner diameter of 105 mm which is charged with one-liter of hard water having 71.2 mg  $\text{CaCO}_3$ /liter, wherein a molar ratio of Ca/Mg is 7/3, and stirred with a stirring bar of 35 mm in length and 8 mm in diameter at a rotational speed of 800 rpm; and filtered with a standard sieve having a sieve-opening of 74  $\mu\text{m}$  as defined by JIS Z 8801, wherein the dissolution rate of the detergent particles is calculated by Equation (1):

$$\text{Dissolution Rate (\%)} = [1 - (T/S)] \times 100 \quad (1)$$

wherein S is a weight (g) of the detergent particles

supplied; and

T is a dry weight (g) of remaining insolubles of the detergent particles remaining on the sieve when a liquid prepared under the above stirring conditions is filtered with the sieve, wherein drying conditions for the remaining insolubles are keeping at a temperature of 105°C for 1 hour, and then in a desiccator with a silica gel at 25°C for 30 minutes.

2. Detergent particles having an average particle size of from 150 to 500  $\mu\text{m}$  and a bulk density of 500 g/liter or more, wherein the detergent particles comprise a detergent particle being capable of releasing a bubble from an inner portion of the detergent particle in a process of dissolving the detergent particle in water, the bubble having a size of one-tenth or more of a particle size of the detergent particle, and wherein the detergent particles have a dissolution rate of 82% or more, under conditions where the detergent particles are supplied in water at 5°C; stirred for 30 seconds under the stirring conditions that 1 g of the detergent particles is supplied to a one-liter beaker having an inner diameter of 105 mm which is charged with one-liter of hard water having 71.2 mg  $\text{CaCO}_3$ /liter, wherein a molar ratio of Ca/Mg is 7/3, and stirred with a stirring bar of 35 mm in length

and 8 mm in diameter at a rotational speed of 800 rpm; and  
filtered with a standard sieve having a sieve-opening of  
74  $\mu$ m as defined by JIS Z 8801, wherein the dissolution  
rate of the detergent particles is calculated by Equation  
5 (1):

$$\text{Dissolution Rate (\%)} = [1 - (T/S)] \times 100 \quad (1)$$

wherein S is a weight (g) of the detergent particles  
supplied; and

T is a dry weight (g) of remaining insolubles of the  
10 detergent particles remaining on the sieve when a liquid  
prepared under the above stirring conditions is filtered  
with the sieve, wherein drying conditions for the  
remaining insolubles are keeping at a temperature of 105°C  
for 1 hour, and then in a desiccator with a silica gel at  
15 25°C for 30 minutes.

3. The detergent particles according to claim 1 or  
2, wherein the detergent particles are a collective of a  
detergent particle comprising a base particle comprising a  
20 water-insoluble inorganic compound, a water-soluble  
polymer and a water-soluble salt, and a surfactant  
supported by the base particle, wherein the base particle  
has a localized structure in which larger portions of the  
water-soluble polymer and the water-soluble salt are  
25 present near the surface of the base particle rather than

in the inner portion thereof.

4. Detergent particles having an average particle size of from 150 to 500  $\mu\text{m}$  and a bulk density of

5 500 g/liter or more, wherein the detergent particles are a collective of a detergent particle comprising a base particle comprising a water-insoluble inorganic compound, a water-soluble polymer and a water-soluble salt, and a surfactant supported by the base particle, wherein the  
10 base particle has a localized structure in which larger portions of the water-soluble polymer and the water-soluble salt are present near the surface of the base particle rather than in the inner portion thereof, and wherein the detergent particles have a dissolution  
15 rate of 90% or more, under conditions where the detergent particles are supplied in water at 5°C; stirred for 60 seconds under the stirring conditions that 1 g of the detergent particles is supplied to a one-liter beaker having an inner diameter of 105 mm which is charged with  
20 one-liter of hard water having 71.2 mg  $\text{CaCO}_3$ /liter, wherein a molar ratio of Ca/Mg is 7/3, and stirred with a stirring bar of 35 mm in length and 8 mm in diameter at a rotational speed of 800 rpm; and filtered with a standard sieve having a sieve-opening of 74  $\mu\text{m}$  as defined by JIS Z  
25 8801, wherein the dissolution rate of the detergent

particles is calculated by Equation (1):

$$\text{Dissolution Rate (\%)} = [1 - (T/S)] \times 100 \quad (1)$$

wherein S is a weight (g) of the detergent particles supplied; and

5 T is a dry weight (g) of remaining insolubles of the detergent particles remaining on the sieve when a liquid prepared under the above stirring conditions is filtered with the sieve, wherein drying conditions for the remaining insolubles are keeping at a temperature of 105°C  
10 for 1 hour, and then in a desiccator with a silica gel at 25°C for 30 minutes.

5. Detergent particles having an average particle size of from 150 to 500  $\mu\text{m}$  and a bulk density of  
15 500 g/liter or more, wherein the detergent particles are a collective of a detergent particle comprising a base particle comprising a water-insoluble inorganic compound, a water-soluble polymer and a water-soluble salt, and a surfactant supported by the base particle, wherein the  
20 base particle has a localized structure in which larger portions of the water-soluble polymer and the water-soluble salt are present near the surface of the base particle rather than in the inner portion thereof, and wherein the detergent particles have a dissolution  
25 rate of 82% or more, under conditions where the detergent

particles are supplied in water at 5°C; stirred for  
30 seconds under the stirring conditions that 1 g of the  
detergent particles is supplied to a one-liter beaker  
having an inner diameter of 105 mm which is charged with  
5 one-liter of hard water having 71.2 mg CaCO<sub>3</sub>/liter, wherein  
a molar ratio of Ca/Mg is 7/3, and stirred with a stirring  
bar of 35 mm in length and 8 mm in diameter at a  
rotational speed of 800 rpm; and filtered with a standard  
sieve having a sieve-opening of 74 µm as defined by JIS Z  
10 8801, wherein the dissolution rate of the detergent  
particles is calculated by Equation (1):

$$\text{Dissolution Rate (\%)} = [1 - (T/S)] \times 100 \quad (1)$$

wherein S is a weight (g) of the detergent particles  
supplied; and

15 T is a dry weight (g) of remaining insolubles of the  
detergent particles remaining on the sieve when a liquid  
prepared under the above stirring conditions is filtered  
with the sieve, wherein drying conditions for the  
remaining insolubles are keeping at a temperature of 105°C  
20 for 1 hour, and then in a desiccator with a silica gel at  
25°C for 30 minutes.

6. The detergent particles according to claim 4 or  
5, wherein the detergent particles comprise a detergent  
25 particle having pores in the inner portion thereof having

a size of one-tenth to four-fifth of the particle size.

7. The detergent particles according to any one of claims 4 to 6, wherein the base particle comprises 20 to 90% by weight of the water-insoluble inorganic compound; 2 to 30% by weight of the water-soluble polymer; and 5 to 78% by weight of the water-soluble salt.

8. The detergent particles according to any one of claims 1 to 7, wherein the detergent particles comprise a uni-core detergent particle.

9. A method for preparing the detergent particles as defined in any one of claims 1 to 8, comprising the steps of:

Step (a): preparing a slurry containing a water-insoluble inorganic compound, a water-soluble polymer, and a water-soluble salt, wherein 60% by weight or more of water-soluble components including the water-soluble polymer and the water-soluble salt is dissolved in the slurry;

Step (b): spray-drying the slurry obtained in Step (a) to prepare base particles; and

Step (c): adding a surfactant to the base particles obtained in Step (b) to support the surfactant

thereby.

10. A detergent composition comprising the detergent particles as defined in any one of claims 1 to 8 in an amount of 50% by weight or more.

Sub  
a1

10

15

20

25

11. A detergent composition having an average particle size of from 150 to 500  $\mu\text{m}$  and a bulk density of 500 g/liter or more, wherein the detergent composition comprises a detergent particle being capable of releasing a bubble from an inner portion of the detergent particle in a process of dissolving the detergent particle in water, the bubble having a size of one-tenth or more of a particle size of the detergent particle, and wherein the detergent composition has a dissolution rate of 90% or more, under conditions where the detergent composition is supplied in water at 5°C; stirred for 60 seconds under the stirring conditions that 1 g of the detergent composition is supplied to a one-liter beaker having an inner diameter of 105 mm which is charged with one-liter of hard water having 71.2 mg  $\text{CaCO}_3$ /liter, wherein a molar ratio of Ca/Mg is 7/3, and stirred with a stirring bar of 35 mm in length and 8 mm in diameter at a rotational speed of 800 rpm; and filtered with a standard sieve having a sieve-opening of 74  $\mu\text{m}$  as defined by JIS Z 8801, wherein the dissolution



rate of the detergent composition is calculated by

Equation (1):

$$\text{Dissolution Rate (\%)} = [1 - (T/S)] \times 100 \quad (1)$$

wherein S is a weight (g) of the detergent composition

5 supplied; and

T is a dry weight (g) of remaining insolubles of the  
detergent composition remaining on the sieve when a liquid  
prepared under the above stirring conditions is filtered  
with the sieve, wherein drying conditions for the

10 remaining insolubles are keeping at a temperature of 105°C  
for 1 hour, and then in a desiccator with a silica gel at  
25°C for 30 minutes.

12. A detergent composition having an average  
15 particle size of from 150 to 500  $\mu\text{m}$  and a bulk density of  
500 g/liter or more, wherein the detergent composition  
comprises a detergent particle being capable of releasing  
a bubble from an inner portion of the detergent particle  
in a process of dissolving the detergent particle in  
20 water, the bubble having a size of one-tenth or more of a  
particle size of the detergent particle, and wherein the  
detergent composition has a dissolution rate of 82% or  
more, under conditions where the detergent composition is  
supplied in water at 5°C; stirred for 30 seconds under the  
25 stirring conditions that 1 g of the detergent composition

is supplied to a one-liter beaker having an inner diameter of 105 mm which is charged with one-liter of hard water having 71.2 mg  $\text{CaCO}_3$ /liter, wherein a molar ratio of Ca/Mg is 7/3, and stirred with a stirring bar of 35 mm in length and 8 mm in diameter at a rotational speed of 800 rpm; and filtered with a standard sieve having a sieve-opening of 74  $\mu\text{m}$  as defined by JIS Z 8801, wherein the dissolution rate of the detergent composition is calculated by Equation (1):

10                     $\text{Dissolution Rate (\%)} = [1 - (T/S)] \times 100 \quad (1)$

wherein S is a weight (g) of the detergent composition supplied; and

15                    T is a dry weight (g) of remaining insolubles of the detergent composition remaining on the sieve when a liquid prepared under the above stirring conditions is filtered with the sieve, wherein drying conditions for the remaining insolubles are keeping at a temperature of 105°C for 1 hour, and then in a desiccator with a silica gel at 25°C for 30 minutes.